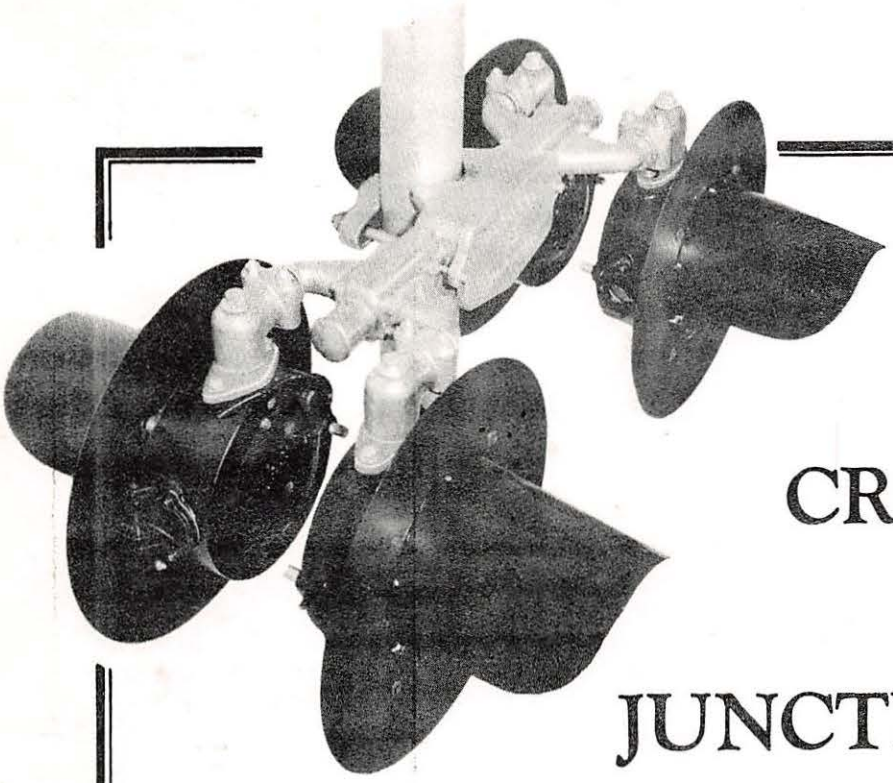


Combined CROSS-ARM and JUNCTION BOX

For Flashing Light Highway Grade Crossing Signals

U. D. 218

Union Switch & Signal Co.
Swissvale, Pa.

TRADE MARK

Union Switch & Signal Co.

SWISSVALE, PA.

TRADE MARK

R818

Subject: Combined Junction Box and Cross-Arm for Flashing Light Highway Grade Crossing Signals.

See Catalogue K-151

Union Development

Number: 218

Date: Feb. 21, 1936

8 Sheets

The trend toward back-to-back assemblies of lamp units for Flashing Light Highway Crossing Signals has introduced a need for more convenient provisions for running wires to and between the lamp units. The answer to this problem has been met in principle by the proposed A.A.R. design of Junction Box and Cross-Arm.

In order that the equipment required for current installations of flashing light signals be made to conform with progress in standardization, the Union Switch & Signal Company has been supplying a combined Cross-Arm and Junction Box mainly in accord with the proposed A.A.R. design. The Union product conforms with those parts of the proposed A.A.R. design which appear to have the general sanction of the Signal Section of the Association. It does, however, include certain modifications of features which at present are under discussion by that body.

There appears to be a strong opinion that wherever practicable, exposed set screws and jam nuts should not be used to lock the adjustment of flashing light signal lamp units. Set screws with either cupped or round ends cut into the part so locked and often define a setting from which it is difficult to change, especially if the readjustment is of small angular magnitude. Jam nuts of the size (1-1/4") used for locking some lamp unit adjustments

require such a large wrench that there is danger of the desired alignment being disturbed, when being locked. Furthermore, exposed threads which serve as a primary element in making a delicate alignment of a lamp unit will ultimately rust or perhaps permit leakage of water into the case.

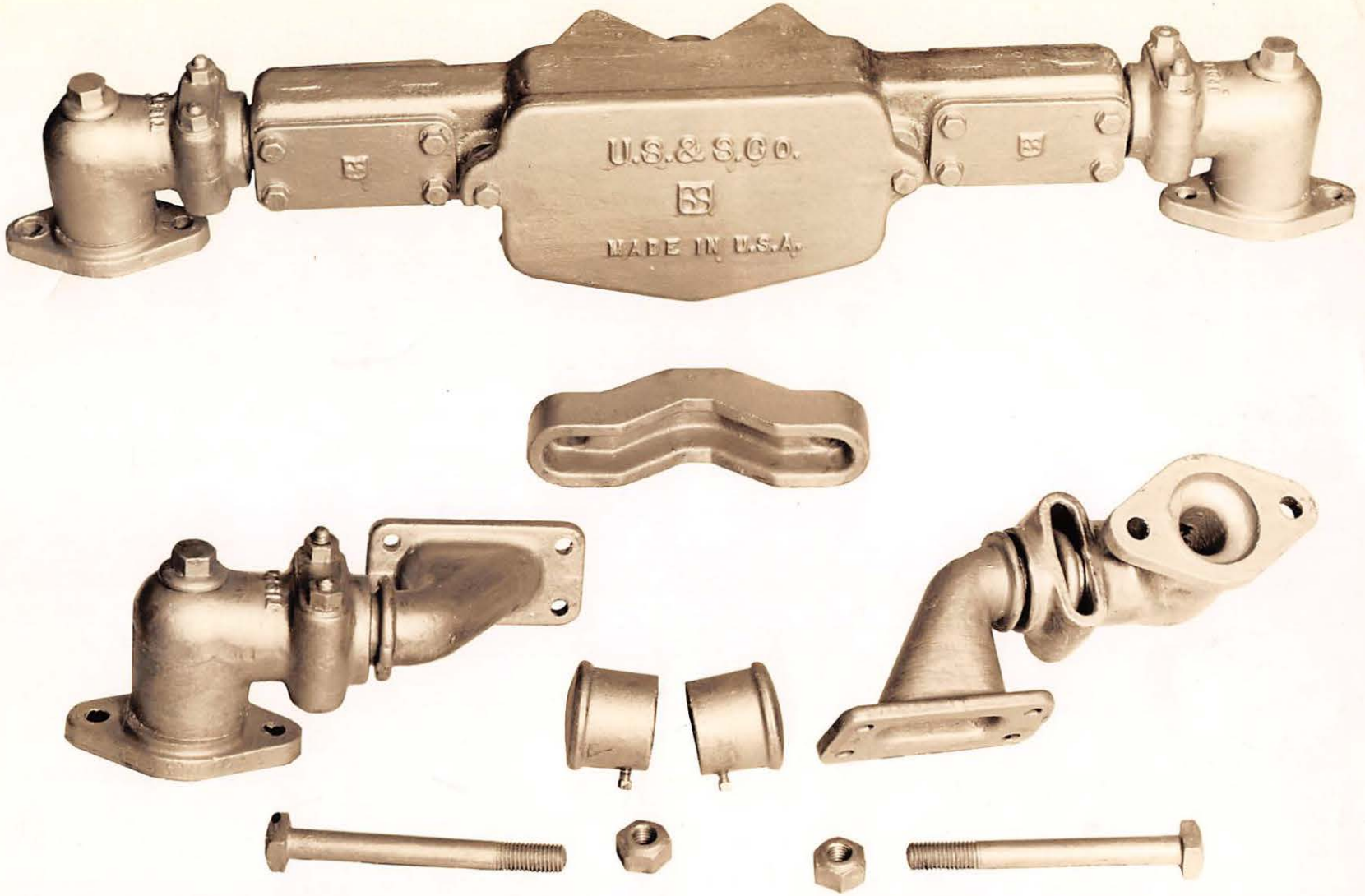
It is assumed that those interested in standardization of Highway Crossing Signal aspects will be familiar with A.A.R. Signal Section drawings 1656A and 1657A which, although not officially approved, are shown in the printed Minutes of the 1935 Annual Meeting, and also with 1656B and 1657B as printed in the Advance Notice for the 1936 Annual Meeting. The following description applies chiefly to the Union interpretation of those details of the A.A.R. proposed design which have been discussed but not settled, and which, during the last year, have been incorporated in a reasonably large number of Union flashing light signals sold to many railroads.

DESCRIPTION

The chief feature of the combined Junction Box and Cross-Arm for flashing light highway crossing signals is the adjustable elbow illustrated in view (c) of Figure 1. It has simple provisions for securing accurate vertical and horizontal adjustments without the use of exposed pipe threads, set screws or jam nuts.

Combinations:

There are two assemblies of the combined Junction Box and Cross-Arm; both use the same main casting H, Figure 1. One assembly is for back-to-back mounting of the Style HC-81 type of lamp unit as shown in Figure 1. The other assembly is for mounting lamp units of


U.S.&S.CO.
MADE IN U.S.A.

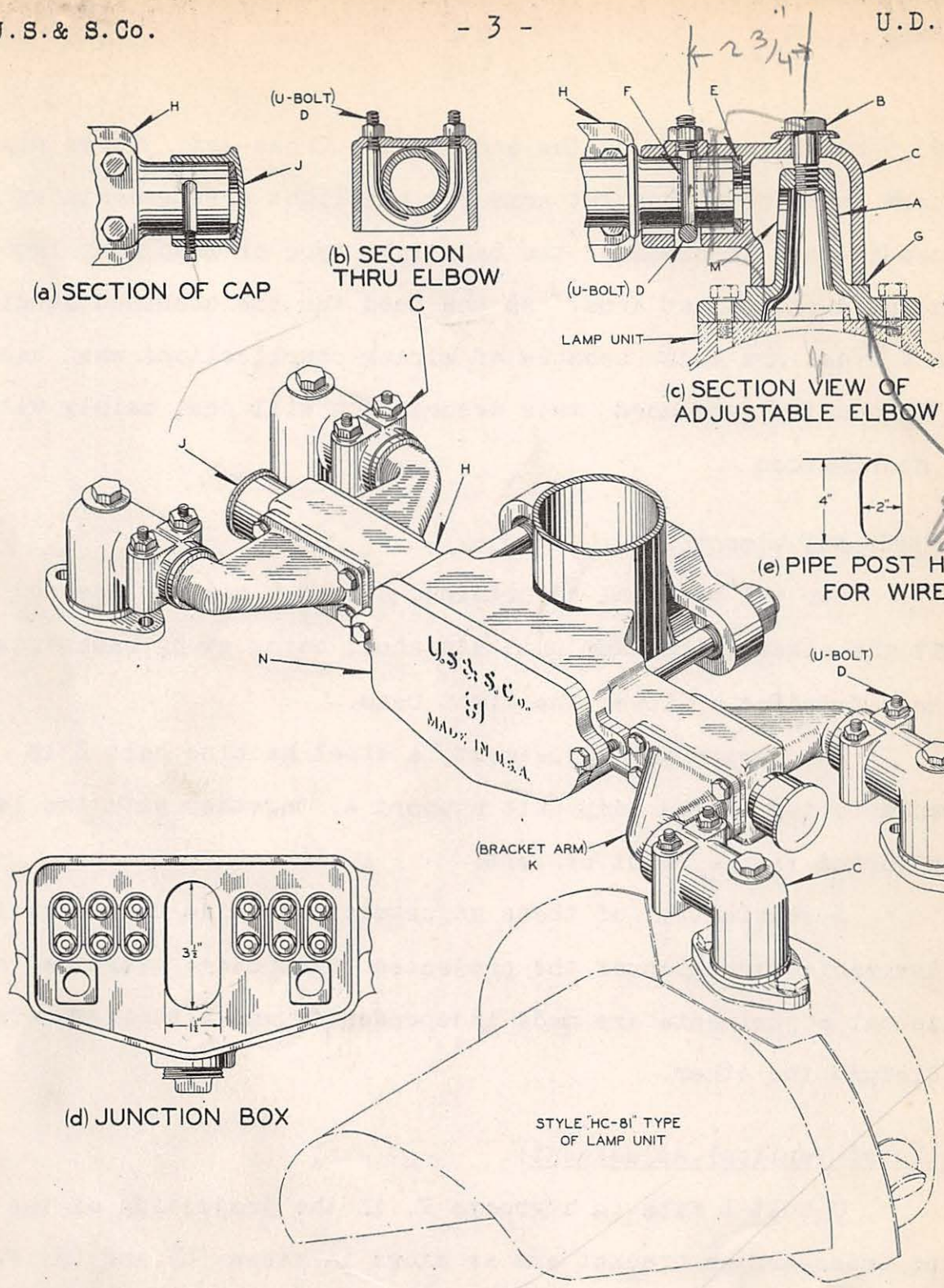


Fig. 1....Assembly and details of Combined Junction Box and Cross-Arm.

the HC-8 backlight type on the ends of the Cross-Arm. Cover plates are used in place of bracket arms for backlight arrangements and an end cap is used in place of the backlight type of lamp when lamps are mounted on bracket arms. As the need for the combined Junction Box and Cross-Arm arose because of wiring complications when back-to-back lamp units were used, this description will deal mainly with that combination.

Lamp Unit Adjustment:

For the vertical adjustment, U-bolt D may be loosened to permit the elbow (with lamp unit attached) being swung backwards or forwards to raise or lower the light beam.

For horizontal adjustment, a steel machine bolt B is loosened to permit the lamp unit support A, together with the lamp, being turned to the right or left.

A combination of these adjustments provide for obtaining any desirable direction of the projected light beam. Vertical and horizontal adjustments are made independently and altering one will not disturb the other.

Details of Vertical Adjustment:

U-bolt D fits in a groove F, in the projection on the end of the Cross-Arm or bracket arm as shown in views (b) and (c) Fig.1. It will be noted that the U-bolt has a full bearing in the lower half of the groove and that the inner diameter of the elbow nearly coincides with that of the outside diameter of the arm or bracket end. Thus the clamping action when the 3/8" U-bolt nuts are tightened is of such magnitude that only a blow liable to break the Cross-Arm

casting would cause distortion of the vertical adjustment.

It will be noted from view (b) Fig. 1, that the elbow casting is skirted to provide greater strength and to shield the necessary opening for application of the U-bolt, from rain. A sponge rubber washer E is used at the joint between the arm or bracket end and the elbow to prevent sand or dust from working into the wire channel.

This arrangement has none of the disadvantages of a special threaded elbow having a slotted end fitted with a clamp through bolt and nut. Such arrangements have many exposed parts which may rust and make readjustments difficult or impossible.

Details of Horizontal Adjustment:

The means for obtaining horizontal adjustment of the lamp unit is simple and effective as shown in view (c) Fig.1. One 5/8" steel machine bolt draws a machined face of lamp support casting A against the finished end of elbow C at G. Since the resulting annular bearing area has an outside diameter of 2-1/2" considerable resistance to torque is offered. By partially loosening the bolt, the lamp unit and support may be rotated smoothly to any desired position and in drawing up on the bolt to lock the adjustment, there is small chance of the adjustment so secured, being disturbed.

The lamp support A has a cored opening at M, sufficiently large to accommodate wires and to permit necessary angular adjustment of the lamp unit without damaging the insulation on the wires. An inverted cup shaped skirt is integral with bolt B, which seals the bolt hole against possible entrance of water.

Elbow may be used on pipe Cross-Arms:

The inside diameter of this improved adjustable elbow where it fits over the end of the Cross-Arm is also the proper size for slipping over the ends of existing 1-1/4" pipe Cross-Arms. In such an assembly there will be no groove on the pipe Cross-Arm to receive the U-bolt, but this is not absolutely necessary as the U-bolt clamp provides a very rugged joint.

Junction Box:

The junction box view (d) Fig.1, contains two groups of a three-way multiple terminal block with the terminal posts moulded in bakelite making a total of 12 terminal posts. Each pair of posts is connected by a metallic connector easily removable so that the forces in the field may, if necessary, make wire connections on single posts and thus be able to handle a total of 12 circuits.

The cover N for the Union Junction Box has a slotted hole on one end and a closed hole on the other. To open the box it is only necessary to partially unscrew the cap screws, unhook one end and allow the cover to hang down from the other end. The box is weather tight as the inside rim of the cover is recessed to carry a 1/2" wide by 1/4" thick felt gasket which has been found very satisfactory.

Pipe Post Clamp:

The pipe post clamp is of the A.A.R. design and is capable of being applied to pipe sizes ranging from 3-1/2" to 5". There is a 3/16" thick rim projection on the back of the main casting which fits into an elongated wire hole in the post, the size of which is

shown in view (e) Fig.1. The wire inlet is thus able to accommodate a greater number of wires than have been provided for in past designs.

Wiring:

Great care has been taken to provide accessibility and capacity for wiring. In cases where the HC-42 illuminated STOP signal has been used below this type of Cross-Arm, we have provided a nipple connection from the tapped hole in the under side of the junction box, to the top of the signal. This saves wiring complications and eliminates the hole in the pipe for the wire inlet, usually required for the STOP signal.

Weather Proofed:

Every means, including those which have proved satisfactory in similar applications, have been used to exclude water and dirt, from the interior of the junction box, cross-arm, adjustable elbow and the lamp unit itself. Cork gaskets are inserted at the joints between the Cross-Arm and the bracket arms and between the Cross-Arm and the covers when the bracket arms are not used.

Materials selected for Strength and Durability:

As has been explained in many places throughout the fore going description, materials used in the Union Junction Box and Cross-Arm are in keeping with recognized service requirements. All exposed nuts, bolts and washers are cadmium plated, double thickness, to resist rust. Cast iron parts are painted in accordance with very strict specifications.

Ordering Instructions:

Until such time as catalog references are available, the Union improved Junction Box and Cross-Arm may be ordered from the following list, referring to this U.D. #218:

A	Combined Junction Box and Supporting Arm Complete for mounting four Flashing Light Units of the HC-81 back-to-back mounted type. (Orders should specify whether to be applied to 3-1/2", 4" or 5" pipe post in order that proper mounting bolts may be furnished).	C-9476-2
B	Combined Junction Box and Supporting Arm complete for mounting two Flashing Light Units of the HC-8 backlight type. (Order should specify whether to be applied to 3-1/2", 4" or 5" pipe post in order that proper mounting bolts may be furnished..	C-9476-1

W. H. Gadwallader
7/21/36